

REMARKS

Reconsideration and allowance of this application are respectfully requested in view of the above amendments and the discussion below.

Applicant's invention, as defined by independent claims 8 and 22, concerns an electrically activated valve which provides improved flow through of fuel during the opening operation. This improvement is brought about by defining a contact area between the valve member and the valve seat to include a step 15 adjacent to a guide surface 16. This step functions to limit the effective hydraulic diameter of the valve so that it remains constant over its entire life and the guide surface 16 provides that the fuel is diverted to a return passage in an optimum manner to avoid cavitation and the associate noise. As discussed in the background of the invention, prior art devices have difficulties with wear due to solid particles in the fuel and cavitation as well as a settling of the valve seat. These effects cause a disturbance in the hydraulic equilibrium which, over time, disrupts the operation of the valve with respect to precise discharge of the fuel.

Claims 8-9 and 22 have been rejected under 35 U.S.C. § 102 as anticipated by the reference to Boehland, U.S. Patent No. 5,810,328. According to the statement of the rejection, the edge 33 corresponds to the claimed step and the annular face corresponds to the guide surface 35. Applicants respectfully traverse this rejection on the grounds that amended independent claims 8 and 22 provide a structure not shown or disclosed by the reference to Boehland. In order to more clearly emphasize the function and structure of the guide surface,

each of independent claims 8 and 22 have been amended to reflect that the item 16 is a flow optimizing guide surface which is configured to avoid cavitation resulting from the flow through the valve. Support for this function and structure is contained in the originally filed specification at page 23, lines 19-22 and page 7, lines 5-6.

The seat gap or annular face 35 of Boehland serves to throw open the valve member 16 and open the valve passage in a rapid and complete manner after the fluid is deflected at deflection point 34 in an axial direction. Accordingly, there is no flow optimizing guide surface which is configured to avoid cavitation resulting from flow through the valve but instead there is a seat gap or annular face which serves as an engagement surface or deflector for the fuel in order to open the valve rapidly and completely.

Claims 8-9 and 22 have also been rejected under 35 U.S.C. § 103 as unpatentable over Gordon et al. in view of Wich, U.S. Patent No. 4,838,232 with the indication being given that it would be obvious to use a solenoid valve with the injector of Gordon. Once again, applicant submits that, although the reference to Gordon is deemed to have what is analogous to a guide surface as indicated by the Board of Appeals in the August 11, 2003 Decision, it is submitted that it is not a flow optimizing guide surface which is configured to avoid cavitation resulting from the flow through the valve. Gordon discloses that because the wide supply conduit 27 is disposed on the same axis as the injection hole 25, flow which is already homogenized in the supply conduit 27 is also

homogenous in the injection hole 25 so that the injection stream exiting from the hole 25 has identical velocity vectors and thus a "uniform stream pattern over its cross section". (Column 3, line 61 to Column 4, line 1) Thus there is no need for a flow optimizing guide surface and certainly no indication that it is configured to avoid cavitation resulting from the flow through the valve. Additionally, claims 8 and 22 require that the electrical activating device provides a force in a direction opposite the valve spring to move the valve in the housing. It is not deemed to be obvious how Gordon could be modified by the electrical activation system of Wich. The reference to Wich 232 provides intermittent pressurized pulses of fuel flow through the use of a solenoid controlled bypass valve. The system of Gordon has been provided with modifications to the injection hole and the supply conduit to provide a uniform stream in response to opening by fluid pressure. These considerations do not apply with respect to the pulsating fluid provided by the system of Wich. Therefore, it is submitted that the combination of Gordon and Wich is not obvious to one of ordinary skill in the art. Additionally, as indicated above, the reference to Gordon does not have a flow optimizing guide surface configured to avoid cavitation resulting from flow through the valve because flow is homogenized by the above discussed relationship between the in-line injection hole 25 and the supply conduit 27.

Therefore in view of the distinguished features between the claimed invention and the references which features are not shown or disclosed or made obvious by the references or their combination, applicants respectfully request

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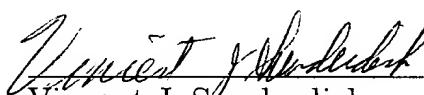
that this application containing claims 8-14 and 22-28 be allowed and be passed to issue.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #038738.48700US).

Respectfully submitted,

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